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Short Communication

Community Section

Response to an Outbreak of COVID-19 Infection among Undergraduate Medical Students in Mumbai, Maharashtra

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ABSTRACT

Introduction: Coronavirus Disease-2019 (COVID-19) is an infectious disease. The most effective way to slow down the transmission is by social distancing and following all the preventive protocols.

Aim: To describe the outbreak of COVID-19 in Undergraduate (UG) medical students of a medical college in Mumbai and steps taken to control the spread as well as to break the chain of transmission of COVID-19 infection.

Materials and Methods: The institutional contact tracing team contacted the positive case and identified contacts as soon as they were notified between 28th September, 2021 to 7th October, 2021 at Seth GSMC and KEMH, Mumbai, Maharashtra, India. A total of 40 students were isolated due to the contraction of COVID infection. History was taken by telephonic calls. Meetings were held among the institute and hostel authorities to prevent the spread. All the contacts of positive cases were separated in a quarantine facility. COVID appropriate behaviour (CAB) was implemented strictly and swab of symptomatic students were taken for Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR). Non academic leisure activities were suspended temporarily. Academic lectures were shifted to an online platform.

Results: This outbreak lasted over a period of 10 days, a total of 40 students were isolated and 89 students were quarantined. Most of the students who were infected were residing in the hostels, 27 (67.5%) and had come in contact with other positive students during the college's cultural fest. Majority of positive cases had received both doses of COVID vaccination. Mild symptoms were present in 87.5% students and rest were asymptomatic. Cases were detected from the same cluster of students and follow-up was done for the next two weeks.

Conclusion: Strategies like scheduled testing for in-campus students, strict implementation of CAB and temporary withdrawal of activities which causes gathering helped effectively to control the spread.

Keywords: Contact-tracing, Coronavirus disease-2019, Isolation, Quarantine

INTRODUCTION

On 11th March 2020, COVID-19 infection was notified as pandemic in India by World Health Organisation (WHO) [1]. It is an infectious disease which is caused by Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2). Virus spreads from infected person via droplets. Till 29th September 2021, India has faced two COVID-19 waves with continuous high testing for COVID-19 [1,2]. After the introduction of vaccination drive in India on January 2021 for COVID-19, widespread vaccination is being done throughout the country [2].

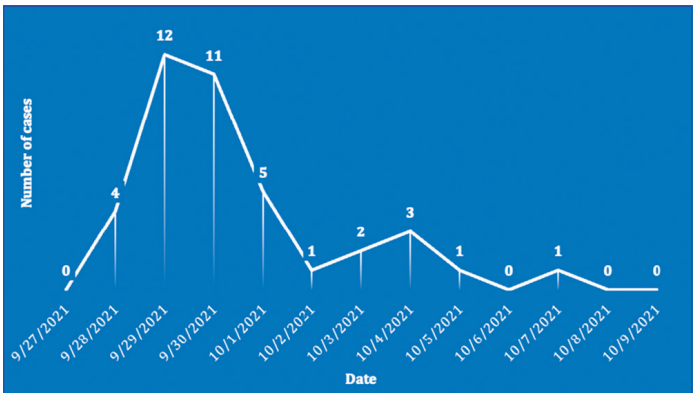
During the second wave, the average number of daily cases in the city was 1713 to 2654 and in state the numbers were 14900 to 18300 [3,4]. Delta variant of COVID-19, was predominantly in circulation at that time [5]. As the COVID-19 pandemic is on a downward curve similar outbreaks are expected in a closed institution setting. This report describes the outbreak and intervention done to prevent further spread. The strategies as described further may be useful for other institutes in responding to similar events.

MATERIALS AND METHODS

This cross-sectional study describes the COVID-19 outbreak at Seth GSMC and KEMH, Mumbai, Maharashtra, India, from 28th September, 2021 to 7th October, 2021. Ethical clearance was taken from Institutional Ethics Committee (EC/OA-144). Written informed consent was obtained from all cases.

A total of 40 UG medical students of a medical college in Mumbai contracted COVID-19 infection within a span of 10 days. [Table/Fig-1] [6]. An institutional contact tracing team was setup in the study area at the beginning of the pandemic. Whenever a positive case was detected, it was immediately notified to the team. Details of the positive case and history regarding contacts with other people were asked via telephone and assessed. This was followed by calls to the contacts of the cases to cross verify the history of contacts. All contacts were quarantined in a separate facility provided by the institute.

Description of the outbreak: A total of 40 cases were detected in this outbreak and total of 89 contacts were quarantined against the contacts while the peak of cases was on day 2 followed by day 3. The details are described below [Table/Fig-1].



[Table/Fig-1]: Number of positive cases detected per day (N=40).

Day 1: Four students from MBBS second year were detected COVID-19 positive by the Reverse Transcription-Polymerase Chain Reaction test (RT-PCR). Contact tracing was initiated immediately and a total of 19 students who were significant contacts (exposed to a laboratory confirmed COVID-19 case, was sharing same room or same working environment, was in close proximity within 6 feet

and exposed >15 minutes duration without any Personal Protective Equipment (PPE) [7] were quarantined against them for 14 days in a facility provided by the institute. The four positive cases were also in contact with each other. History revealed that the index case i.e., (IC) first case which comes to the notice of the health facility [8] was a common contact of many students as he attended several meetings as a class representative and participated in a few cultural and literary activities. Symptomatic contacts were asked to test immediately and seven other students having significant contact with IC were quarantined. The COVID-19 infected students were sent to the hospital for isolation to prevent further spread in hostels that have shared lavatories and dining areas. All students were asked to avoid gathering for food, academic or leisure activities. Other students who were part of the cultural and literary fests were also asked to get tested immediately if they were symptomatic.

Day 2: Another seven students from MBBS second year and five students from MBBS first year were detected COVID-19 positive. Of the seven MBBS second year students, three were in quarantine already and the rest had significant contact with the students placed in quarantine on the previous day. Cases had overlapping contacts. Another 10 students of MBBS second year who were identified as contacts were quarantined. Eleven students of MBBS first year were also quarantined. Though the MBBS first year and second year positive students did not report any direct contact with each other, they were part of cultural and literary activities and visited the same canteen premises often. All the cultural and literary fest activities were withheld with immediate effect and all the students involved were asked to test for COVID-19 immediately irrespective of symptoms. On-campus canteen used by UG students were found as a common source of infection. Higher authorities were informed about the situation.

Day 3: In the morning, a meeting was conducted with the head of the institution and other stakeholders. Based on the urgency of the situation, prompt measures were taken to end the chain of transmission- all on-campus leisure cultural and literary fest activities and meeting points including eateries were strictly closed for UG students. Use of masks and social distancing norms were reinforced in public places including hostel corridors. Surprise visits in the hostel was taken by the wardens to ensure adherence to CAB. Academic activities were continued via online mode and off-campus students were asked not to come unless they wanted to use hospital facilities. Scheduled screening by RT-PCR test was started for all the on-campus UG students. Active surveillance (door to door) was done in the hostels by hostel in-charges for symptomatic students which was followed by Rapid Antigen Test (RAT) and RT-PCR testing.

Hostel buildings (rooms, corridors, lavatories and other common places) were disinfected frequently with 5% hypochlorite solution under supervision [9]. All support staff working in the hostels were also asked to undergo testing. E-commerce delivery agents were restricted to the common entrance only and students were asked to use contactless delivery. Nine new cases from MBBS second year were also detected positive, out of which two were already quarantined and developed symptoms during their quarantine period and were tested immediately. The other seven were also symptomatic and gave a history of contact with cases from Day 1 which was previously denied. Ten fresh students were quarantined against these cases, and seven were already in quarantine due to contact with positive cases. Apart from this, two MBBS first year students also tested positive. One of the positive MBBS students had a total of 19 contacts and all were quarantined. As hostels were not suited for isolation, COVID positive students residing in hostels were isolated in hospital and COVID positive day scholars opted for home isolation.

Day 4: Four new cases from MBBS second year and one new case from MBBS first year were detected positive. This positive MBBS first year student had developed symptoms during quarantine period, hence got tested. Eight new contacts from MBBS second year and one from MBBS first year were quarantined against them immediately. Scheduled testing for detecting the cases were continued.

Day 5: One MBBS third year student was tested positive and one student from the same batch was quarantined for being his contact. There was no history of contact with any of the previously isolated or quarantined students. However, the hostel premises were the same.

Day 6: Another student from MBBS third year and one student from final year MBBS turned positive with five contacts who were quarantined. Cases were part of cultural activities described previously.

Day 7: Two MBBS second year students and one final MBBS student was detected positive. One among these two MBBS second year students, were already quarantined and tested positive on the fourth day of quarantine. There was no new significant contact for this case. The other positive MBBS second year student had no contact with any of the previous cases. His roommate was his only contact and was quarantined. The final MBBS student reported being in contact with a positive case. This case had one significant contact who was quarantined promptly.

Day 8: One MBBS second year student was positive who gave no history of contact with any of the previously positive cases but participated in some cultural activities. Four new students were quarantined.

Day 9: No case was detected.

Day 10: One MBBS second year student was detected positive. He did not have any history of contact with any of the previous cases but lived in the room adjacent to the COVID-19 positive students.

No case was detected thereafter from this cluster for upto two weeks. All students were re-tested at the end of quarantine. All students were discharged following the isolation period (atleast 7 days have passed from the day of testing positive and no fever for 3 successive days) [10]. Full recovery was seen among all students.

STATISTICAL ANALYSIS

Data was analysed by using Statistical Package for the Social Sciences (SPSS). Descriptive analysis was used for data analysis.

RESULTS

Total of 40 students were tested positive for COVID-19 infection and were isolated within span of 10 days. Mean age of the cases were 19.98±1.07 years (Range: 18-22 years). Among these students, 25 (62.5%) were males and 15 (37.5%) were females. Majority of cases were detected from MBBS second year (70%).

The probable source of infection in 26 (65%) cases were contact with positive case. Majority of the cases, 27 (67.5%) were residing in hostels only.

Total 55% of positive cases opted for hospital isolation and 67.5% of contacts opted for institutional quarantine. Only 11 students (27.5%) tested positive from their quarantine.

Majority of the cases were symptomatic (87.5%) and mostly tested positive via RT-PCR test (92.5%). Cough (45.71%) was the most common symptom observed. All symptoms were mild in nature; despite of this due to non availability of adequate isolation facility in hostels, some students were admitted in hospital. All of them were fully vaccinated with covisheild except only one (not vaccinated). The clinico-epidemiological details of forty students who tested positive are given in [Table/Fig-2].

DISCUSSION

An outbreak in the institution campus is always a challenge for the administration. With the decreasing trend of COVID-19 cases

Patient characteristics (N=40)		Value
Age (Mean±SD) years		19.98±1.07 (Range: 18-22)
Gender	Male	25 (62.5%)
	Female	15 (37.5%)
Faculty	MBBS First year	8 (20%)
	MBBS Second year	28 (70%)
	MBBS Third year	2 (5%)
	MBBS Fourth year	2 (5%)
Source of infection	Unknown	6 (15%)
	Contact with positive case	26 (65%)
	Others*	8 (20%)
Residence	Hostel	27 (67.5%)
	Home/private apartment	13 (32.5%) [6 (46.15%) among 13 stayed in shared flats]
Isolation facility (n=40)	Hospital	22 (55%)
	Home	18 (45%)
Quarantine facility (n=89)	Institute provided facility	58 (65.17%)
	Home	31 (34.83%)
Type of test	RAT	3 (7.5%)
	RT-PCR	37 (92.5%)
Symptoms	Present	35 (87.5%)
	Absent	5 (12.5%)
Type of symptoms (n=35, symptoms noted among 35 symptoms positive: Multiple response was taken)	Fever	11 (31.43%)
	Cough	16 (45.71%)
	Cold	6 (17.14%)
	Sore throat	12 (34.29%)
	Loss of taste	2 (5.71%)
	Loss of smell	1 (2.86%)
	Others†	15 (42.86%)
Vaccination status	Fully vaccinated	39 (97.5%)
	Not vaccinated	1 (2.5%)
Type of vaccine (n=39)	Covishield	39 (100%)
Students who came positive from quarantine		11 (27.5%)

[Table/Fig-2]: Clinico-epidemiological profile of the COVID positive students (N=40).
*Travel in public transport, group outings, group study, canteen, cultural activities and sports were reported as other sources of infection.
†Body ache, headache, eye ache, weakness- reported as other symptoms

elsewhere, such outbreaks can create panic too. Vaccines play a crucial role in limiting the spread of virus and severity of the disease. This may also create a false belief among people leading to relaxation of the norms of CAB. Breakthrough infections (≥14 days after second dose) have been reported after COVID-19 vaccination [11]. This was witnessed among the UG students of our institute where forty students were tested positive within a span of 10 days, 39 of which were breakthrough infections. The cultural and literary fest activities, common eateries, group studies, group sports became a potential source of infection spread and hostels became the hotspots.

The contact tracing team, under the aegis of the Department of Community Medicine, acted promptly to prevent the spread of this outbreak. Since most (67.5%) of the students were staying in the hostel, they were each other's contact. Total 65% cases were exposed due to contact with positive cases, and another 20% reported the exposure during group outings, group studies, canteen, cultural activities and sports. In 15%, the source was unknown. This necessitates isolation of positive students (asymptomatic also) in an isolation facility to prevent further spread in the hostel. Separation of exposed students and mandatory quarantine for 14 days further helped in breaking the chain of transmission.

Many students (87.5%) reported mild symptoms lasting for an average of two-three days. Symptoms in few students had resolved even before they were tested. Among the positives, 27.5% developed symptoms during their quarantine period and turned out positive.

A study by Fox MD et al., describes an outbreak of COVID-19 in the university campus of Indiana which was prevented by aggressive testing, withdraw of in person classes for some days, tracing of contacts and isolation of cases [12]. Walke HT et al., also reported strategies followed in the university of Georgia during arrival of students in campus where they have mentioned that two phased testing- pre arrival testing and follow-up testing after one week, scheduled weekly screening, testing on demand and random testing of students were helpful to detect cases and prevent an outbreak [13]. In our institute contact tracing, testing of symptomatic students and contacts of cases, isolation of cases, quarantine of contacts, active case finding in hostel, testing at the end of the quarantine period, temporary closure of cultural and sports events, temporary use of virtual mode of classes and strict implementation of CAB helped to prevent the spread of COVID-19.

Limitation(s)

There is no provision for going to the site and investigate the outbreak. Entire procedure is telephonic call based. Since contact tracing relies mostly on history given by the case and probable contacts, it is not always possible to identify all contacts. Students may hide history of contact delaying the process.

CONCLUSION(S)

Decreasing trends of cases may lead to relaxation of restrictions which may cause some clusters of positive cases. Aggressive testing, timed contact tracing, reinforcement of CAB, availability of isolation and quarantine facilities were helpful in successful hotspot containment. This model of control of outbreak can be followed if there are any cases of further similar episodes anywhere.

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